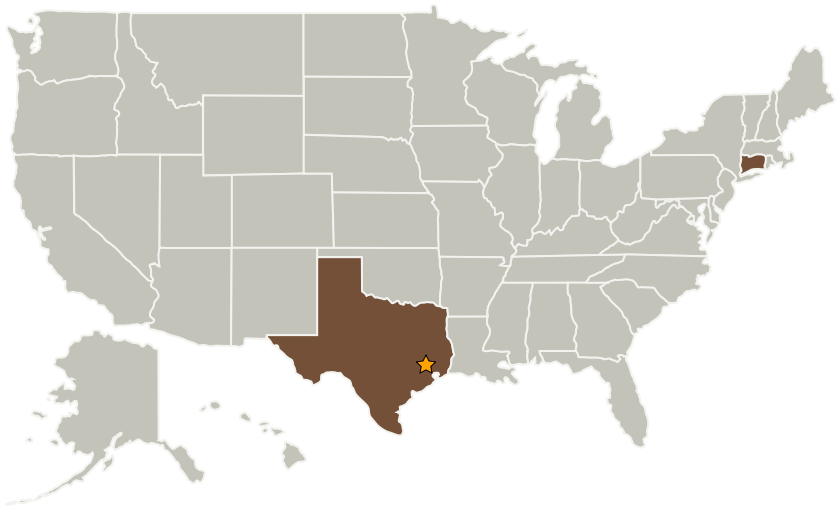
Hard Upper Torso Shoulder Joint Design for Crew Member Sizing Adjustment and Enhanced Mobility, Phase I

Completed Technology Project (2008 - 2008)

Project Introduction

Air-Lock, Incorporated proposes to design an Enhanced Shoulder Mobility Joint Assembly (ESMJA) that increases dynamic mobility and static sizing capabilities for spacesuited crewmembers (CM) employing a Hard Upper Torso (HUT). The proposed shoulder joint will allow historically fixed Hard Upper Torsos to be sized in-situ by crewmembers of varying anthropometries. The Shoulders will also increase CM range of motion in a pressurized spacesuit and incorporate must mitigating strategies geared towards lunar exploration. Throughout Phase One, Air-Lock will exhibit the following innovations: • Design pressure sealed ESMJA that optimizes mobility and sizing characteristics of Hard Upper Torso Advanced Planetary Spacesuits. • Utilize 3D CAD software to design, develop and integrate the ESMJA with the MK-III HUT. • Perform a materials evaluation in order to determine the lightest, most robust material to be use in the manufacture of the ESMJA. • Create a matrix highlighting sizing potential and added mobility (i.e., range of motion). • Perform a comparative analysis of the sizing and mobility matrix to historic NASA anthropometry data to determine the optimum HUT sizes required to outfit current NASA astronaut corp.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
Air-Lock, Inc.	Supporting Organization	Industry	Milford, Connecticut

Primary U.S. Work Locations	
Connecticut	Texas

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Ralph Toscano

Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.2 Extravehicular Activity Systems
    - TX06.2.1 Pressure Garment